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Turning the STEM Tide: An Approach for Mentoring Young Women on How to Thrive in STEM Careers

by MW Cole

ARL-TR-7029 **August 2014**

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14. ABSTRACT

The committee on Women in Science, Engineering, and Medicine (CWSEM) advocates and promotes actions to increase the participation of women in science, technology, engineering, and mathematics (STEM) disciplines. Even when a large number of women enter STEM professions, data show that women do not advance professionally at the same rate as men. Reasons for this are attributed to that fact that many women in academic, industry, and government STEM sectors end up in low-tier and/or part-time/shared positions to accommodate family and family-related social demands. To mitigate this trend, it is critical to initiate mentoring and role model networking relationships for young women interested in STEM careers early-on. Thus, we have developed the Young Women in Science and Engineering (YWISE) annual workshop for high school girls interested in pursuing STEM careers. The mentoring program provides girls unprecedented access to successful women who have thrived in STEM disciplines, facilitating candid interactive discussions on trends, professional and personal life balance, and obstacles and opportunities for women in STEM fields. This report discusses YWISE and its mission to connect these future female scientists and engineers with successful women in STEM fields not only to inspire them to pursue STEM but also mentor them at an early age on how to thrive in STEM careers.

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1. Introduction and Background

1.1 Women and STEM

Many definitions are offered for the science, technology, engineering, and mathematics (STEM), occupations; however, from the technology point of view in this report, STEM refers to the physical, biological, and agricultural sciences; computer science; the engineering disciplines, and mathematics. The STEM workforce is crucial to America's national economy; hence, expanding, developing, and maintaining the STEM workforce is a critical issue for the US. According to the US Census Bureau, in 2011 women composed 26% of the STEM workforce (USCB, 1970–2011). It should be noted that the US census grouped social scientists within their STEM database, which skews the numbers of the women STEM workers to an inflated value. Specifically, the US Census Bureau determined that over the last 20 years women made up over half of the social science workforce, while at the same time women in technology fields such as the engineering disciplines made up only 13% of the workforce. Thus, lumping social scientists into the STEM data mix falsely inflates that actual numbers of women in STEM occupations. Therefore, the actual percentage of women within the STEM occupations as defined by technologists (omitting social scientists) is significantly lower than that reported via US census statistics, confirming that women are still vastly underrepresented in STEM professions.

If one considers candidates for STEM careers as moving along a pipeline from elementary school to secondary school to college to advanced degrees and eventually into STEM occupations, one would hope that the amount of women exiting the pipeline would be a large percentage of those at the onset of the pipeline (Fig. 1), hence constituting a pipeline with minimal "leaks." Unfortunately "minimal leaks" in the pipeline is not the case, for example, considering women in tenure-track professorships, the "leaky pipeline" is well documented (Blickenstaff, 2005). Research statistics clearly indicate that the female STEM pipeline definitely leaks (NSB, 2010). Reasons for the "leaky pipeline" have been an intense area of study, and among such studies, a survey by Preston (2004) stands out as it represents data reflective of those women leaving the field as opposed to the majority of studies, which concentrate on those women remaining in the pipeline. Preston (2004) surveyed 1,688 scientists (excluding social scientists) and engineers, and reported that women leave science careers in greater numbers than men. Her research determined that women who pursued academia as their career choice exited their occupations at a rate of 14% versus 3.7% for their male counterparts. Additional findings of her study determined that married females with doctorate degrees were 11% less likely than single women to work in science. Another study by Mason and Goulden (2002) showed that the effect of having children significantly affected women's retention in STEM academic careers. Their data, which consisted of a survey of 4,457 facility members, showed that women are less likely to have children in the pre-tenure stage than men, suggesting that women are delaying

marriage and children, hence reinforcing the perception that to "make it" in STEM academia a women cannot flourish and raise a family at the same time. In addition, data from Preston's (2004) study also determined that women's discontent with science, i.e., the manner in which it was conducted, the work climate/culture, and the unfavorable interpersonal interactions with their male colleagues within their institutions, are some of the major reasons that women exit their scientific careers. Other reasons for leaving STEM included lack of mentorship or guidance, a female-unfriendly culture, and excessively long work hours; however, the career demands (complexity and workload) were not considered unreasonable or difficult.

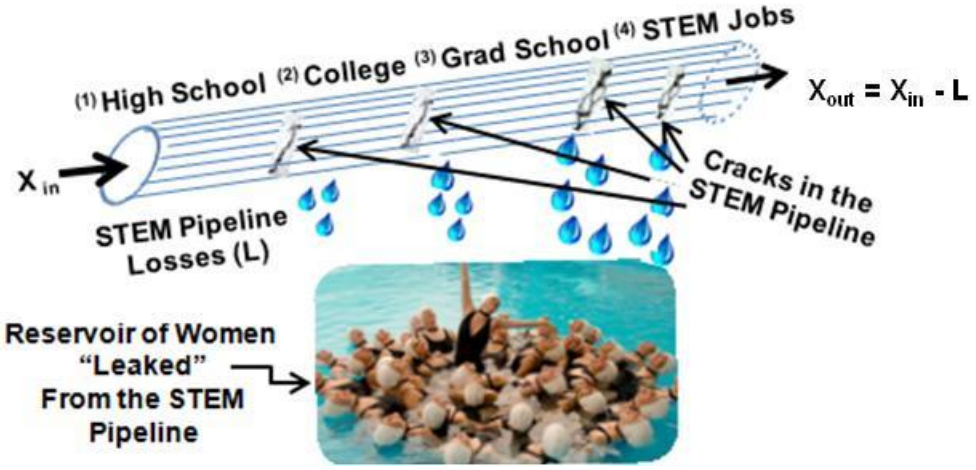

Fig. 1 A schematic representation of the STEM pipeline showing women entering (X_{in}) the pipe and cracks along the pipe enabling female losses (L) from the pipeline. The amount of women exiting (X_{out}) the STEM pipeline is significantly less than the amount of women who entered due to losses along the STEM pipeline.

1.2 An Incremental Glimpse of the STEM Pipeline

Over the last two decades, the US has tried to increase the number of women in STEM occupations by encouraging STEM exposure for girls in middle and secondary school. This idea is that if more girls are "stuffed" into the STEM pipeline, a larger number of women will exit the pipeline; hence, women will no longer be an underrepresented class in STEM occupations. The education, science, and engineering communities charged with increasing STEM exposure early on have done an excellent job with traditional STEM outreach activities, for example, having scientists visit and speak at local schools, take your child to the lab day, eCybermission, science fairs, and designing and administering science and engineering modules aimed at middle and high school students. While all of these programs are indeed excellent and reach out equally to both young women and men, it is apparent that there are still leaks in the female STEM pipeline that are still limiting the output of women into the STEM occupational workforce. Thus, there is a critical need to place a larger emphasis on encouraging young women not only to enter, but remain within the STEM pipeline. To accomplish this, an incremental assessment of the major sections of the STEM pipeline is critical for 1) identifying at what stage the "leaks" occur and 2) unraveling the reasons responsible for the leaks.

Examining the data trends for average credits earned in mathematics and science, by gender, from 1990–2009 revealed that high school girls earned math and science credits at the same rate as boys (USDE, NCES, 2009). These data suggest that the female STEM pipeline is fairly strong, showing minimal female leakage characteristics up to the end of high school. Unfortunately, the transition from high school to college has a profound effect on the flow of women through the pipeline, constituting a "leaky stage." It is well known that women make up the majority of college students; however, women are less likely to major in STEM fields with respect to their male counterparts. According to the National Science Foundation (NSFDSRS, 2009) in 2006, 30% of male freshmen versus only 15% of females planned to major in STEM fields, and if biological sciences are excluded, this figure drops drastically to 20% of males versus a mere 5% of females undertaking majors in engineering, computer, or physical sciences. Thus, although graduating high school girls are well qualified for STEM majors, many of these academically capable women never pursue or elect to leave STEM majors while in college. Further examination of the STEM pipeline in the time domain shows that the number of women earning doctorial degrees in STEM disciplines has improved significantly from 1996 to 2006 (Table 1). However, at the doctorate level, women still remain underrepresented in every STEM field except biology. This suggests that the transition from undergraduate to graduate school constitutes another "leak" in the flow of women through the STEM pipeline.

Table 1 Doctorate degrees earned by women in STEM fields in1966 and 2006 (Hill et al., 2010 p. 12)

Year	STEM Fields		
	Biological & Agriculture sciences	Chemistry & Mathematics	Earth, atmospheric, ocean sciences; physics; engineering; computer science
1996	12.5%	6%	<3%
2006	50%	33.3%	20%

Figure 2 shows that women's representation in the STEM workforce has improved greatly from 1960 to 2000. During this time frame, women in the biological sciences have displayed a sizable presence since 1960. However, for other STEM fields, such as the physical sciences and engineering disciplines, the growth of women in these fields has been significantly smaller. Considering physics-related fields, in 1960 women made up 3.4% of the workforce only to increase to 13.9% four decades later; hence, women still make up a small fraction of physics-based occupations. Such data indicate that there are other leaks in the pipeline as women transition from graduate school into their STEM occupations and there are post-education losses solely within the STEM career workforce. If the leaks in the female STEM pipeline are not addressed and mitigated, the pipeline may continue to trickle out only a very small number of women into the STEM occupations, especially for the physical sciences and engineering disciplines. Similarly, if retention of women in STEM occupations is not addressed, the pipeline may ultimately run dry.

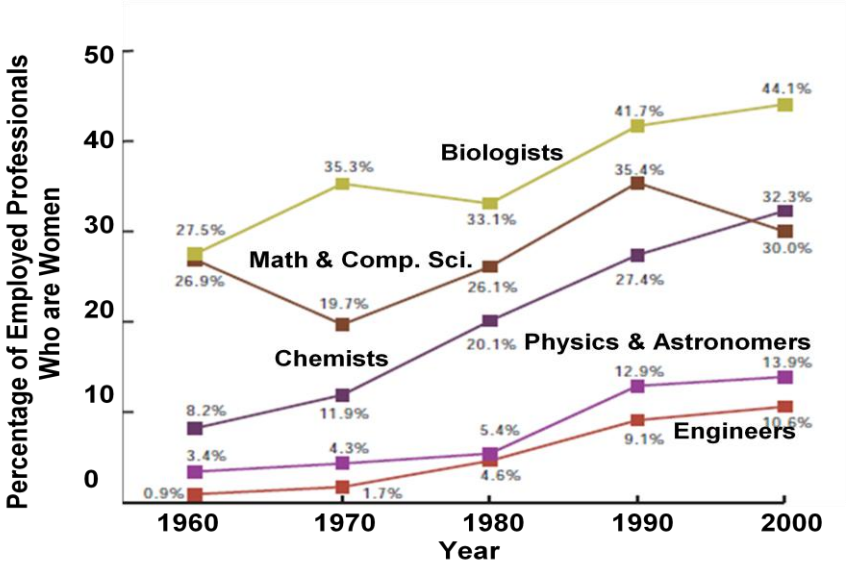

Fig. 2 Percentage of women in select STEM occupations from 1960 to 2000 (Hill et al., 2010 pg. 14)

2. The Young Women in Science and Engineering (YWISE) Workshop

As previously discussed, the onset of the STEM leaky pipeline appears to begin as young women transition from high school into college; hence, it is important to offer STEM mentoring programs to women at the high school level. Jahan et al.'s (1999) research indicated that most young women enrolled in college science and engineering programs were strongly influenced and/or mentored by female role models; therefore, mentoring young women at the high school and early college stage is vital for female retention in STEM college majors. Thus, to address this mentoring need, we have developed and implemented the Young Women in Science and Engineering (YWISE) program. The YWISE Workshop is sponsored and funded by three organizations, namely, the US Army Research Laboratory (ARL) via an ARL Fellows Stipend, the Battelle Eastern Science and Engineering Center, and Aberdeen High School, all which are co-located in Aberdeen, MD. The workshop is a one-day event that is free to the participants. The workshop's organizing committee consists of scientists from ARL, executive management professionals from Battelle, and science and math teachers from Aberdeen High School. The workshop was started in 2011 and targets high school girls who are highly motivated to pursue STEM occupations. The workshop's overarching goal is not only to inspire the next generation of young women to consider STEM careers, but more importantly educate them on the challenges and opportunities that they will encounter as an underrepresented class in such a career. The workshop brings together accomplished women in STEM professions and high school girls to provoke thoughtful discussions, mentor these young women on STEM college and career survival, and provide them strategies for thriving in the STEM arena. The workshop was

constructed to be a "forum without boundaries," where no topic is off limits within the workshop's discussion venue.

The workshop objectives include the following:

1. Offer young women a unique mentoring opportunity that currently in not part of their traditional high school guidance and educational curriculum inventory.
2. Provide motivation, guidance, encouragement, and support strategies to young women for addressing and overcoming the challenges they will encounter as an underrepresented class in the STEM arena.
3. Offer unprecedented access to successful women in STEM with candid discussions focused on women and STEM careers, achieving balance between profession and personal life, and the challenges and opportunities encountered by women in STEM fields.
4. Address issues such as confidence building and creating a sense of belonging for women STEM majors in the college domain; understanding the climate/culture of the STEM college/workplace and defining strategies to achieve a "sense of fit" to enable confidence and satisfaction; understanding the stereotypes and biases toward women in STEM; and seeking/developing strategies for maintaining technical competence without sacrificing "likeability," both which are required for STEM career advancement.
5. Teach the value of mentoring, relationships, and role models for navigating the STEM pipeline.

To successfully achieve these objectives, the framework of the YWISE Workshop included invited speakers, panel discussions, and relationship-building mixers. The forum hosts five successful women speakers, who are diverse in STEM fields, as well as in ethnicity, age, and stages of development within their STEM careers. The STEM professionals included women from academia, industry, government, medical professionals, and entrepreneurs who discussed the balance of personal and professional aspects of their lives/careers, and trade-offs required for professional success and personal equilibrium. The speakers also highlighted the challenges they faced from college to career, and the strategies they used to endure/overcome these obstacles and celebrate the opportunities. The forum was designed to encourage interaction between the speakers and students, and engage everyone in open and frank discussions. After the presentations, the venue included an interactive mixer (to initiate and foster relationships between the participants and the speakers) followed by a few talks from young women who graduated for Harford county local high schools and are now early-career women in STEM occupations. The workshop concluded with an interactive panel discussion, which enabled the workshop participants to connect with the speakers by asking questions and engaging in candid conversations.

As an illustrative exercise to understand the underpinning mentoring mechanics of this event, several of the YWISE speakers and their mentoring messages are highlighted below:

1. A pediatric surgeon and assistant professor in the Department of Surgery, University of Maryland School of Medicine. This speaker, a 40ish woman of Asian descent, discussed the trials and triumphs of performing delicate surgery on small children. She also discussed how she's become a proficient surgeon by believing in herself, seeking guidance and mentorship from senior female surgeons, and accepting the fact that you can achieve all your goals (both personal and professional), but probably not at the same time. She discussed how she took a few years off from her medical career to nurture her family, but how during this hiatus she maintained contact with her peers and continued "networking" within the medical-surgical community, both of which enabled a smoother career reentry.

2. Associate professor of mathematics at the US Naval Academy and Research Faculty, Johns Hopkins University School of Medicine who discussed her career as a college professor and her passion as a champion swing dancer and avid slalom water skier. This speaker, a 35ish Caucasian women, told how she fell victim to the stereotype that "girls are not as good at math as boys." In college she was often told that because she "struggled" with math and the associated STEM fields that required a significant mathematics foundation that she did not have what it took to pursue her math and operations research career goals. She spoke on how becoming engaged with her female math professors for educational and cultural guidance helped her to realize that the word "struggle" is not a bad word. She highlighted that given the complexity and abstract nature of the STEM disciplines, of course, one struggles, it's hard; innovation and discovery are difficult! She stressed that "to struggle" is part of challenging yourself. She stated that her pursuit of dance and sports in parallel with her career path helped her to mitigate STEM stresses by counterbalancing her academic struggles with her natural talents.

3. Professor and chairperson of information systems and operations research at Loyola University Maryland, who spoke on intelligent decision technologies and her career path, which has spanned from teaching math to the gifted and talented middle school children to becoming a senior mathematician and technical manager at a government laboratory to becoming a full professor and academic director of Executive MBA Programs at the University Maryland. This particular speaker, a 55ish Caucasian woman, discussed how she balanced family life with her educational and career desires, whereby she accomplished her educational career aspirations incrementally over a longer time frame with respect to her male counterparts. She stressed that one can have it all, but probably not at the same time. She also highlighted that the STEM career climate within her government career organization (male dominated) left her with a feeling on not belonging, and over time lowered her confidence. She discussed the avenues that she undertook to mitigate this threat to include enhancing her technical competence, networking with others external to

her organization, volunteering within the technical community, and most importantly, never giving up.

4. A senior chemical engineer with the Army's Chemical Biological Command, who spoke on the challenges of performing in her career while facing bias associated with being a double minority (black female) within a male-dominated STEM workforce. This speaker, a 50ish black female, was the first black scientist hired into her organization. She highlighted that the biased attitudes of both her peers and supervisors created an unhealthy workplace climate, which, in turn, created obstacles of unfairness, lack of opportunities, and the feeling of "not fitting in." She discussed her strategies to mitigate these obstacles, which included informal mentoring from other female scientists and engineers external to her organization and becoming more active within professional societies to gain access to the technical networking that is critical for success in a STEM research career. She also emphasized that it is important to realize that sometimes you cannot overcome certain obstacles so you must define strategies to move forward. Explicitly, she discussed how she turned her obstacles into her successes by leveraging her skills in engineering, innovative thinking, and program management to transform her quilting hobby into a viable business. She used her STEM skills to become a flourishing entrepreneur, as a quilt artist, quilt tool designer, successful author, and an accomplished publisher.

Aside from the speaker presentations another important aspect of the YWISE venue in 2014 was the inclusion of recent college graduates at the onset of their STEM occupations. One of these young women recently received her BS in environmental science and is currently working as a scientist in a government laboratory and the other young woman recently completed her BS and MS degrees in computer science and is working in the industrial sector. Both young women concurred that they were academically very well prepared for STEM college classes but that the college STEM environment still posed many obstacles. The sense of "not fitting in," gender bias, stereotyping, and lack of inclusion in the male-dominated study groups or cliques were echoed by both of these speakers. Both women stated that working with other female college peers, inclusive of female study groups and social gatherings, within and external to their respective majors, helped them to cope with the negative aspects of the STEM college culture. The young woman who earned her degrees in computer science stated that joining her department's women in computer science organization helped her to form relationships with other female computer science majors and gain a sense of belonging. Finally, the last segment of the workshop, devoted to the panel session, enabled everyone to engage in thought-provoking discussions. The girls were very interactive with the speakers and asked questions related to both their personal lives and professional careers.

Considering the contents of the presentations and panel discussions, it is clear that all of these accomplished women, regardless of age, race, and/or STEM occupation, encountered many challenges/obstacles associated with being an underrepresented class in the STEM arena. The presentations highlighted that the college STEM environment often leaves young women with

the sense that they do not belong simply because of their gender. This promotes the feeling of "not fitting in," which often results in a decline in women's confidence and is an institutional problem. Concerns of how to balance your passions (dance, sports, volunteerism, etc.) with educational career aspirations was also discussed by the speakers. Also highlighted was how to achieve equilibrium between family responsibilities and the STEM career path. All the speakers stated that the nature of their work in STEM was exciting and attainable; however, the STEM college environment and workplace culture often caused disruption and dissatisfaction in their careers paths. All agreed that mentoring and defining strategies for STEM success are necessary to help women navigate the STEM career path obstacles and enable them to thrive on the STEM playing field. Table 2 displays a consolidated list of "words of wisdom" that were put forward to help young women steer their course as they travel through STEM pipeline.

Table 2 Mentoring words of wisdom for thriving in the STEM arena

• Network, Network, Network! Networking with other STEM professionals, especially those that are technically your senior will enable you to learn more, motivate you to think outside the box and be more productive. Networking outside ones organization is important and rewarding. Networking within one's own organization is often inhibited by internal competition, gender bias and stereotyping hence may be less fruitful. It is recommended reaching out as much as possible!
• Volunteer and Give Back! Yes, give your time and give back to the STEM community by organizing technical symposia, workshops and conferences. Not only will you help the technical community, you will gain organization skills, easily meet others in your field, create collaboration opportunities and most importantly others will know who you are! Giving back also involves mentoring others, it is rewarding and teaching is the best way to learn!
• Collaborate, Collaborate, Collaborate! Science today is more different than in the past, today you cannot do everything by yourself, you cannot be "expert" and proficient at every part of your research topic and time is so very limited. Collaboration yields a more comprehensive research product which ultimately yields that journal paper which will be heavily cited.
• Read, Read, Read! Knowledge is power. Knowledge of the technical literature provides the basis for most innovations and discoveries. It also provides facts and data that can be articulated in technical discussions with both peers and management, it enables you to stand out "technically" and be noticed.
• Document, Document, Document! Avidly documenting you results in archival journals gets your name "out there", it also builds your resume; which unlike your managers remains with you for life!
• You must take negatives and turn them into positives because bad things will inevitably happen. Life is not fair and it is difficult to change other individual's negative behaviors; however you can change the way you react to such behavior. Turn negative actions into positives, use them as motivators to be more proactive and productive, this will help you to "Thrive" in your STEM career!
• Never, Ever Give Up! Don't settle for "Surviving" in your science career, set your path to "Thrive"! And yes, you can have it all, but unfortunately you can't have it all at the same time.

3. Workshop Assessment and Impact

For experimental research, it is critical to have metrics that indicate the success and impact of the project. For all three years of the YWISE Workshop, an assessment survey was administered to

the participants. This evaluation was very successful in characterizing the impact of the workshop and its curriculum. The survey was administered to the participants at the workshop's conclusion, and the participants were given ample time to complete and provide comments. The participant evaluation survey is displayed in Table 3. The survey demonstrates that the workshop improved over the three-year period, i.e., achieved progressively higher scores for each question within the forward time domain. For all three years, "*The Value Proposition Met"* question clearly indicates that this mentoring event put forward a positive information gain for the majority (>85%) of the participants. The higher scores in all categories for the 2014 event may be due to the venue modification, whereby former students served as speakers and discussed their STEM college experiences. The participants resonated with these 22-year-old-ish speakers, most likely because there was a negligible generation gap between these speakers and the participants. For all three years, all the participants strongly agreed that they now had a better understanding of the opportunities and challenges that women in STEM fields encounter and ≥95% of the participants concurred that they understand the importance of mentoring as a "positive" strategy to mitigate obstacles. The participant survey also included a section that requested that the participants share their comments as to what was useful and most interesting to them with respect to the YWISE event. Table 4 summarizes several select comments put forward by the young women who participated in the workshops. These comments can be considered a "qualitative" measure or metric of success for the YWISE Mentoring Workshop. The impact of this project was extremely positive and there was an overwhelming response from the participants to continue this mentoring event with the hope of exposing more young women to this venue.

Table 3 Results of YWISE student evaluation for 2011/(2012)/[2014]

Questions (# of participants 41)	Neutral	Strongly Disagree	Disagree	Agree	Strongly Agree
1. Topic of event was interesting; I learned new information.		2.44%	4.87%	21.96 (19%) [10%]	70.73 (81%) [90%]
2 .The presenters were knowledgeable, easy to follow and interesting.				14.64% (8%) [4.2%]	85.36 (92%) [95.8%]
3 .Value Proposition Met: Value of my time was equal to the value of the information gained.			4.89%	19.51% (10.87%) [4.5%]	75.60% (89.13%) [95.5%]
4. I have a better understanding of the challenges and opportunities of under-represented classes in STEM fields					100% (100%) [100%]
5.. I understand the importance of mentoring and strategy development for under-represented classes in STEM fields				5% (3%)	95% (97%) [100%]
6. I would Recommend this event to others					100% (100%) [100%]

Table 4 Summary of participant comments for the YWISE mentoring workshop

No	YWISE Participant Comments
1	I did not realize how motivating this workshop would be. It seems that my dreams to be in science may come true. I was glad to see that this workshop was not like all the other traditional outreach programs we have had in the past. It was actually valuable and motivating, thank you!
2	Very inspiring, being in a male dominated career and seeing how to navigate through it all. Made me rethink my future plans, I am excited about my future and now understand how to be better prepared for all that I may encounter in college as an engineering major.
3	Very inspiring talks and panel discussions. I never really thought about how to get through the STEM pipeline before. Finding a good mentor and support system seems to be critical for getting through all this, college and career. I feel better prepared
4	Very interesting to see how life can take you in so many directions. Liked hearing how the speakers balanced science/engineering with art and their personal lives. Speakers were awesome, thank you for the opportunity to be a part of this event! Very motivational!
5	The wisdom and encouragement of these women was amazing. Please continue to do this workshop next year; this event has sparked a light into my future. Thank you!
6	The commitment and motivation provided by this workshop was amazing, thank you for the inspiration and the opportunity.
7	This was amazing and inspirational
8	This workshop made me feel that I could do anything in life as long as I put my mind to it. Thank you so much for this opportunity, this pushed my mind in a new direction.
9	This workshop was excellent; please do this again next year!
10	This was so much better that all the STEM stuff we get elsewhere, it was more of a reality check to let us know that mentoring is important to success in STEM education and careers.
11	Fun, engaging, and interesting, I will remember this for the rest of my life, thank you for providing us this opportunity!
12	Really enjoyed the “good housewives guide”, focus on persistence and not being discouraged by having to struggle.
13	Enjoyed hearing how women have to balance home-work situations. Definitely keep this workshop going, it was amazing and it would be great if more girls could benefit from this.
14	Excellent presenters, so much information was presented, whether it is educational/academic or personal. The most relevant to me was the balance between creative artistic pursuits and academics, I never want to choose between that and science. Truly motivating event!
15	The determination of these women to succeed through adversity was inspiring and motivating.
16	All the information presented was useful; however the most interesting was hearing the individual stories of the speakers, truly motivating

Table 4 Summary of participant comments for the YWISE mentoring workshop (continued)

No	YWISE Participant Comments
17	Thank you for inviting me, it really opened my eyes a lot. I feel more confident about attending college in the fall, I am majoring in engineering
18	I had expected all of the speakers to have come from "well-to do" families, but a lot of them struggled and had it very difficult. Very inspiring and motivating.
19	The speakers were true role models, inspired me so much!!!
20	The speakers gave me encouragement, and they taught me that mentoring is helpful for everyone esp. for women in physical sciences and engineering careers.
21	The workshop provided me with tools for helping me succeed in science and in life. Thank you
22	This was a great empowering program, please keep it going!
23	Loved the different backgrounds and perspectives of the speakers.
24	I would recommend this event to all my friends, very informative and inspiring! Very cool event, thank you for this inspiring opportunity!
25	Amazing event, I learned so much thank you! Hope it continues!

4. Conclusion

The literature clearly demonstrates that the female STEM pipeline is very leaky, hence causing women to be an underrepresented class in the STEM work force. It is also known that as women navigate through the STEM pipeline high school girls entering college are very well qualified to pursue STEM majors in college and ultimately enter into STEM careers, yet the statistics show that women entering and retaining their status in STEM occupations is very low. We advocate that exposing high school age young women to mentoring programs like YWISE prior to entering college may help mitigate some of the leaks in the college and graduate school sections of the STEM pipeline, hence serving to augment the number of women retained in STEM occupations. YWISE is not a traditional "STEM Outreach" program, instead YWISE is a mentoring event, which was designed to enlighten, educate, and prepare young women for the challenges that they will encounter in their path from the college environment to their STEM careers. Three years of metrics from the YWISE workshops demonstrate that this mentoring program was well received by its participants, that the YWISE venue put forward a positive information gain to the majority of the participants, and that it was considered to be a critical element in their extramural educational curriculum. The impact of this mentoring project was extremely positive and there was an overwhelming response from the participants to continue this YWISE mentoring event in the future.

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List of Symbols, Abbreviations, and Acronyms

ARL	US Army Research Laboratory
CWSEM	committee on Women in Science, Engineering, and Medicine
STEM	science, technology, engineering and mathematics
YWISE	Young Women in Science and Engineering

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